Lumen LED
The *Measure* of Light!

Sheldon Norberg
CEO

California Energy Commission
High Performance Buildings and Standards Office

Re: Docket number 12-BSTD-03
California Quality LED Lamp Specifications

Gentlemen,

Having just returned from the Energy Star Partners meeting, I would very much like to weigh in on the proposed California Quality LED Standards. My company, Lumen LED, is focused not only on producing only Energy Star certified products, but to exceed those standards to the highest degree possible. We appear to have the first lamp that meets the new LEDA Tier II standards for PG&E, and want to do the same for *California Quality*. However, there are certain attributes of the standards that we feel run counter to a achieving the goal of LED adoption, or actually meeting consumer's *needs*.

While we agree that Energy Star standards are too low, one of the things that everyone I spoke to on the EPA side agreed upon was that the primary focus of a higher standard should be on efficacy. Because Energy Star is a public/private organization, they seem to be forced to make concessions on that issue. We see their efficacy standard as a shockingly low bar, particularly when we are producing lamps with 82-88 lpw. We as manufacturers must strive for the highest lpw possible, or the greatest value of LEDs, to reduce energy use and thereby carbon emissions, will be lost.

Looking at the proposed standards, however, I see the efficacy requirements are not only a low priority, they are taken from Energy Star! As I lifetime Californian, I consider it an insult to call a 55 lpw bulb *"California Quality,"* This pitiful efficacy standard is almost necessary however, in order to counterbalance the CRI requirements of the proposed standards, which, *if they were weighted toward efficacy*, would mirror what we perceive as real world values.

Now that poll takers are calling every day, I'm highly sensitive to the fact that their questions are skewed to the responses they desire, and that my personal views outside of answer a,b or c, or scale 0-9, do not apply. But those answers and scales do not in any way conform to the real depth of the issue. This makes me wonder, how has "Color Quality" become the most important issue here?

When I look at the chart of Decision Making Criteria for fixture installation within your own report, I see this most important issue, so called *"Light Quality"*, is actually comprised of FOUR DISTINCT ATTRIBUTES! Weighting each of these equally at 5-7.5% (depending upon sector), each single attribute accounts for LESS IMPORTANCE THAN ANY OTHER, particularly Purchase Price and Life Cycle Cost.

If the respondents were to rate those four attributes, I believe that that color temperature and light distribution would be most important, and that CRI, which the proposed standards push to the top of the scale, would account for less than 4%. Yet these standards propose a long term definition based on a virtually unattainable CRI >90, when Energy Star actually exceeds the world with CRI >80. Our manufacturing partners commonly deal with a world market in which a CRI of 75 is acceptable.

From our perspective, CRI itself is an outmoded scale, used to define fluorescents in terms of incandescent, when we are actually needing to compare LEDs to daylight. We feel that the qualifications should be based on CQS, but of course, that is still in the ether, or suffocated. In either case, the question of whether the average consumer can tell the difference between a CRI of 85 (the LEDA standard), and 90, is a major determinant that should be heavily tested before this is approved.

To get to a CRI of 90 may require color blending technologies that not only eliminate efficacy, but are patented and would require manufacturers to pay additional third parties, something that adds to the end user cost, which, as I read your chart, is of much greater importance, as it rolls into life cycle cost as well.

Listening to the State of the Market presentation at Energy Star, (Stephen Bickel, D&R International, Ltd.) I was also struck by their heavily researched conclusion that surveys about lighting yielded distinctly conflicting information from actual audits, and that in the residential market, people were extremely likely to inflate their adoption rate. Might they have answered your surveys with an equal mind toward sounding intelligent?

On top of that, several sessions went into the difficulty of simply communicating the basics of the new lighting terminology, and how unprepared the market is for this transformation. From utilities to rebate programs to NGOs to retailers to public comments, the message that end users are confused, and that setting standards based on the most arcane priorities will not serve them, the market, the manufacturers, or the state, in its MANDATE to save energy.

From our position, it will only leave them doubly confused when an Energy Star lamp could save them 50% more energy than a Cal Qual lamp that simply makes their drapes look more sandstoney. In the commercial sector, where the initial adoption of LEDs will take place, the move toward daylighting, decreased general illumination, and more task lighting, makes pushing for higher CRI seem particularly inappropriate, as task lighting products are not part of the standard either.

Lumen LED
The *Measure* of Light!

When it comes to lamps and light distribution, there are many who question the logic in trying to manufacture a 21st century technology to 20th century standards. We've agreed that the burning filament can no longer be afforded, but we have not adjusted our expectations of what a lamp should ***be*** accordingly. It is mathematically impossible to get true omnidirectionality from a series of unidirectional platforms, which is the barebones fact of LED lamps. If we accept that this is the technology, moving forward, we must accept the limitations accordingly. Yes, the omnidirectional goals are laudable, but even the standards as they are allow for 5% variation in output, and many E* approved lamps do not meet this qualification.

The question here is, whether the end user can tell? Certainly we strive for the even light distribution, but when a lamp is in a luminaire with a glass cover or a shade, does true omnidirectionality (defined by the current standards) even matter? When we break directionality back to its less than 8% of importance (based on the chart) we have to ask the question, How is directionality perceived by the respondents?

A quick look at the LED market will show hundreds of directional lamps posing as bulbs, with the simple addition of a semi-sphere to a flat array of chips. Anyone who has seen one of these travesties in action will confirm the need for omnidirectionality, without recognizing that what they really want is side light. Where they asked about side light, or omnidirectionality? The technical complexity to achieving a well side lit bulb is far from that of true omnidirectionality, and of much greater importance to the general market.

By eliminating Semi-directional lamps from the California Quality LED definition, you will be limiting the consumer choices to a rigorously applied technology defeating standard. The Energy Star Certified Products list itself does not say whether products have met directionality standards. Some do, some don't, but you can't tell which. Lumen's A bulb, which exceeds the LEDA Tier II criteria, is non-standard, and as a California Corporation (and obviously, from the tone of this letter), we would be upset if denied the opportunity to prove our California Quality.

This is all without even mentioning lifetime. The promise of LEDs is in energy savings across 50,000 hours, but Energy Star standards require only 25,000. Why replicate this low bar as well. True, Lumen LED may be limiting its long term corporate viability by designing without obsolescence, but a 50,000 hour life is attainable with the proper heat management and components, and we have achieved it. That is how LED wins the environmental argument, so shouldn't every California Quality LED lamp last a lifetime?

I hope that the panel take this input seriously, reforms the standards with input from the manufacturing and other sectors, and comes back with a proposal that will win for all Californians, and all Quality LEDs.

Respectfully, Sheldon Norberg, CEO, Lumen LED Incorporated